



**Red Hat**  
**Beaker**

# BEAKER PROJECT

AUTOMATED TESTING AT RED HAT

**TOMAS KLOHNA**

Product Owner

A person wearing a white lab coat and white gloves is pouring a dark, viscous liquid from a glass bottle into a graduated cylinder. The background is a blurred laboratory setting. The text "WHAT IS BEAKER SOLVING?" is overlaid in a white rectangular box in the center of the image.

# WHAT IS BEAKER SOLVING?

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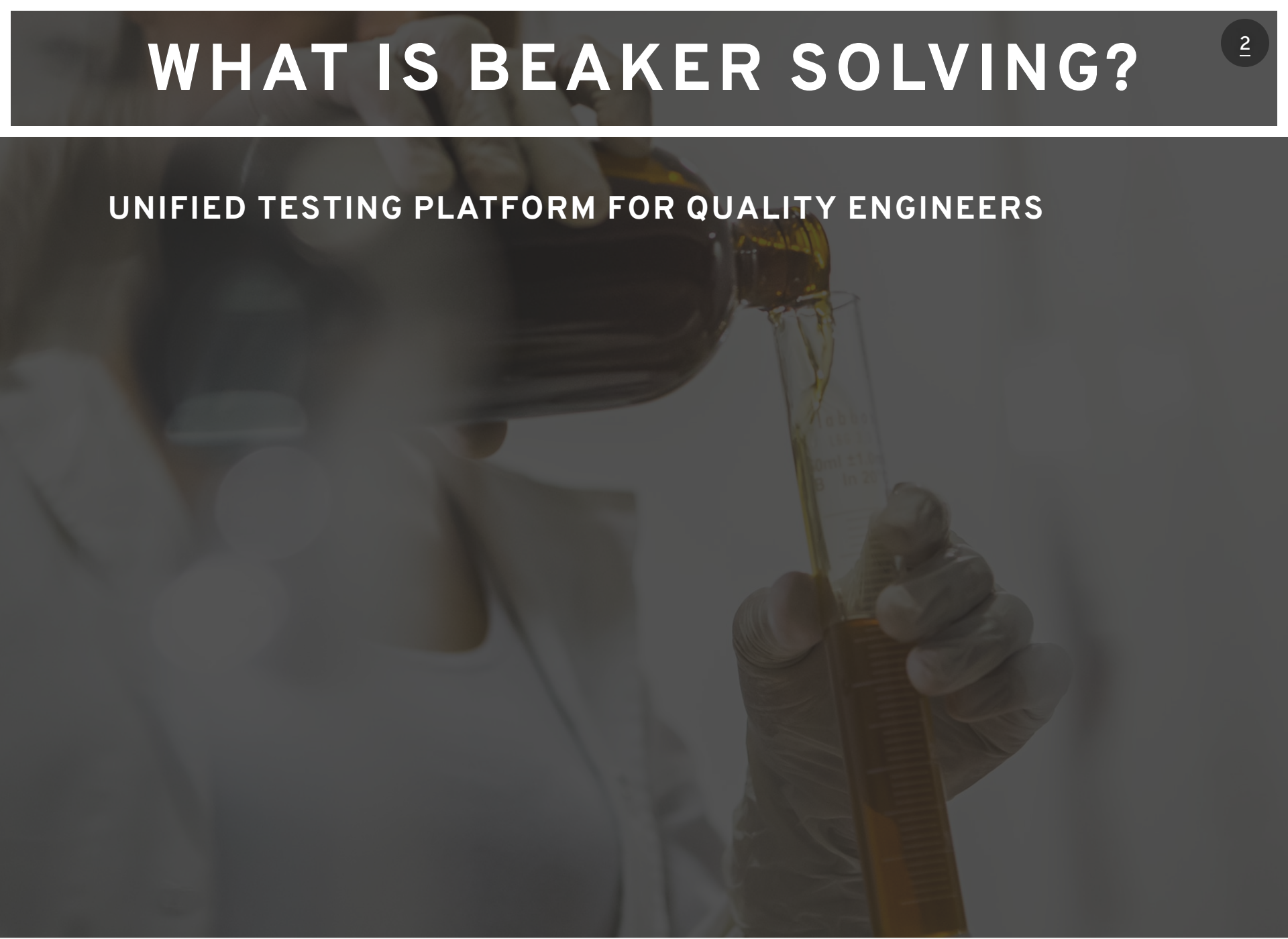
2



# WHAT IS BEAKER SOLVING?

2

UNIFIED TESTING PLATFORM FOR QUALITY ENGINEERS



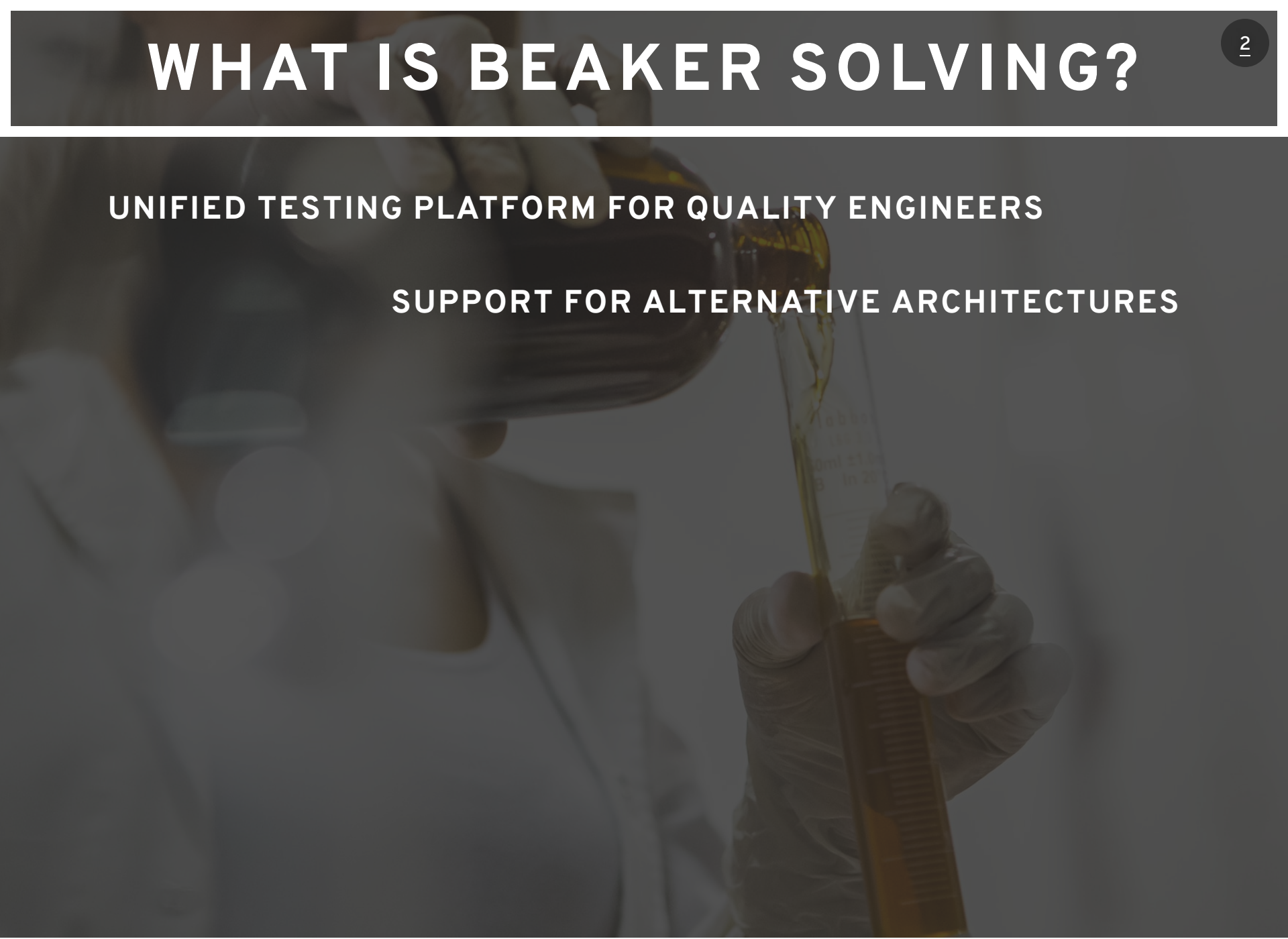


# WHAT IS BEAKER SOLVING?

2

UNIFIED TESTING PLATFORM FOR QUALITY ENGINEERS

SUPPORT FOR ALTERNATIVE ARCHITECTURES



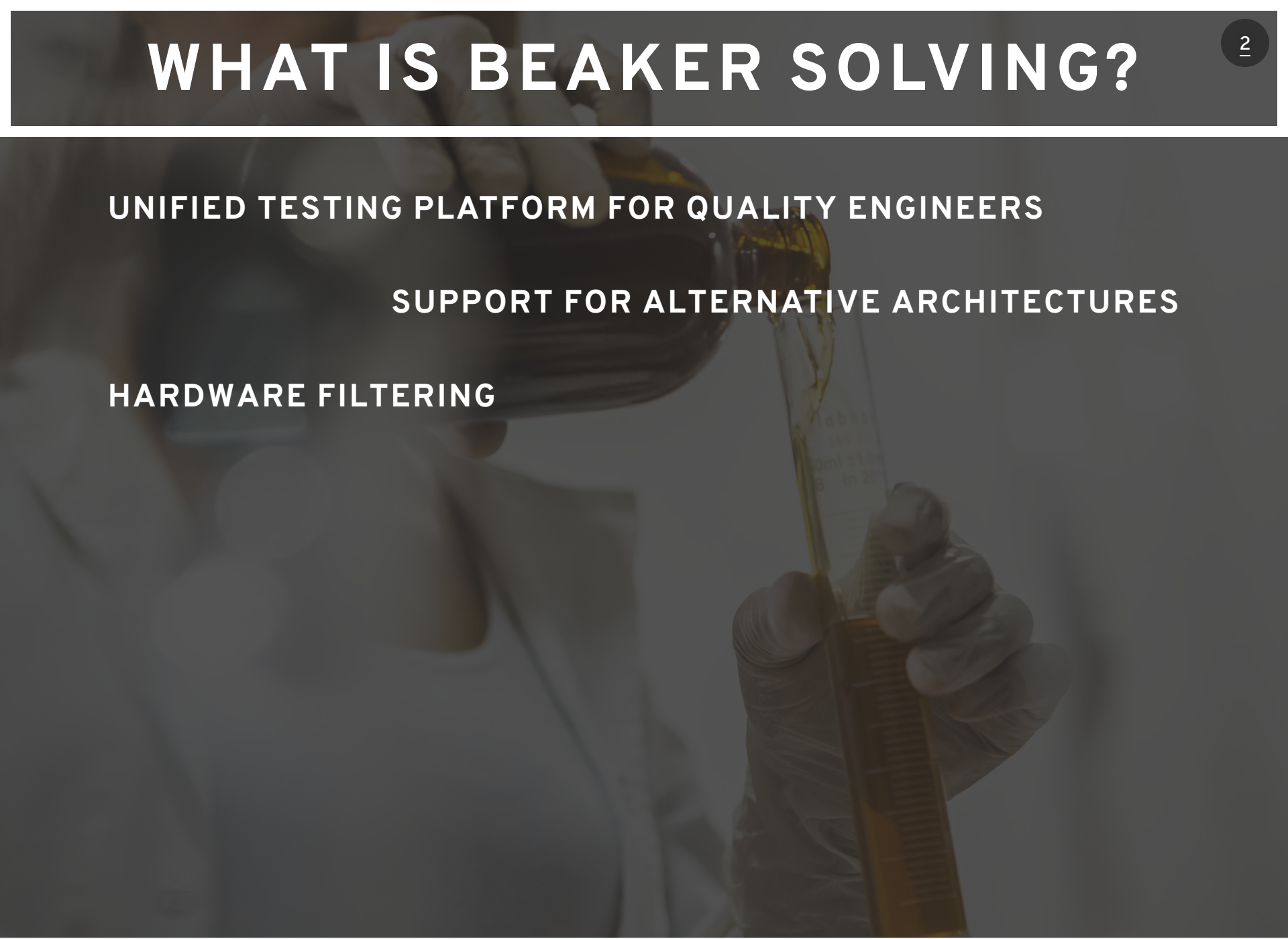
# WHAT IS BEAKER SOLVING?

2

UNIFIED TESTING PLATFORM FOR QUALITY ENGINEERS

SUPPORT FOR ALTERNATIVE ARCHITECTURES

HARDWARE FILTERING



# WHAT IS BEAKER SOLVING?

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HARDWARE FILTERING

FULL-STACK TESTING (**METADATA > USER LEVEL**)

# WHAT IS BEAKER SOLVING?

2

UNIFIED TESTING PLATFORM FOR QUALITY ENGINEERS

SUPPORT FOR ALTERNATIVE ARCHITECTURES

HARDWARE FILTERING

FULL-STACK TESTING (**METADATA > USER LEVEL**)

RESULT & LOG COLLECTION



# WHAT IS BEAKER SOLVING?

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SUPPORT FOR ALTERNATIVE ARCHITECTURES

HARDWARE FILTERING

FULL-STACK TESTING (**METADATA > USER LEVEL**)

RESULT & LOG COLLECTION

COMPLEX MULTI-SYSTEM TEST SCENARIOS

# WHAT IS BEAKER SOLVING?

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SUPPORT FOR ALTERNATIVE ARCHITECTURES

HARDWARE FILTERING

FULL-STACK TESTING (**METADATA > USER LEVEL**)

RESULT & LOG COLLECTION

COMPLEX MULTI-SYSTEM TEST SCENARIOS

COMMON TESTING HARNESS - RESTRAINT

An aerial photograph of a large shipping yard or port. The yard is filled with numerous rows of intermodal containers in various colors, including blue, red, white, and green. A yellow forklift is visible in the lower center, and a red truck is in the upper right. The entire image is overlaid with a semi-transparent dark grey filter.

# INVENTORY MANAGEMENT



# INVENTORY MANAGEMENT

3.2





# INVENTORY MANAGEMENT

An aerial photograph of a large shipping yard. The yard is filled with numerous rows of shipping containers in various colors, including blue, red, green, and white. A yellow crane is visible in the lower-left corner, and a white truck is parked in the center-right area. The ground is paved and marked with white lines.

3.2

## MACHINE DETAILS

# INVENTORY MANAGEMENT

3.2

## MACHINE DETAILS

### CPU

Vendor	IBM/S390
Model Name	2964
Family	0
Model	3290088
Stepping	0
Speed	0.0
Processors	2
Cores	0
Sockets	0
Hyper	True
Flags	te esan3 highgrs dfp stfle ldisp edat eimm sie zarch vx etf3eh msa
Arch(s)	s390x

### System

[Edit](#)

Host Hypervisor	(not virtualized)
Vendor	IBM
Model	2964 - N63
Serial Number	02 - 00033E8
MAC Address	
Memory	2048 MB
NUMA Nodes	0



# INVENTORY MANAGEMENT

3.2

## MACHINE DETAILS

### Disks

Model	Size	Logical sector size	Physical sector size
3390/0c	7.39 GB / 6.88 GiB	4096 bytes	4096 bytes
3390/0c	7.39 GB / 6.88 GiB	4096 bytes	4096 bytes
3390/0c	7.39 GB / 6.88 GiB	4096 bytes	4096 bytes
3390/0c	7.39 GB / 6.88 GiB	4096 bytes	4096 bytes

# INVENTORY MANAGEMENT

3.2

## MACHINE DETAILS

### Devices

Description	Type	Bus	Driver	Vendor ID	Device ID	Subsys Vendor ID	Subsys Device ID	Firmware Version
<a href="#">Motherboard</a>	bus	Unknown	Unknown	0000	0000	0000	0000	
<a href="#">3215 terminal</a>	communication	ccw	3215	0000	0000	0000	0000	
<a href="#">Card reader/punch</a>	generic	ccw	vmur	0000	0000	0000	0000	
<a href="#">Line printer</a>	PRINTER	ccw	vmur	0000	0000	0000	0000	
<a href="#">Channel-to-Channel device</a>	NETWORK	ccw	ctcm	0000	0000	0000	0000	
<a href="#">1732/01</a>	NETWORK	ccw	qeth	0000	0000	0000	0000	
<a href="#">z/VM IUCV hypervisor console</a>	generic	Unknown	hvc_iucv	0000	0000	0000	0000	
<a href="#">1732/01</a>	NETWORK	ccw	qeth_I2	0000	0000	0000	0000	V642



# INVENTORY MANAGEMENT

3.3





# INVENTORY MANAGEMENT



3.3

## MACHINE HISTORY

# INVENTORY MANAGEMENT

3.3

## MACHINE HISTORY

	Scheduler	2018-08-09 16:13:46 +02:00	Power	off	Completed
	Scheduler	2018-08-09 16:13:35 +02:00	Power	configure_netboot	Completed
	Scheduler	2018-08-09 16:13:33 +02:00	Power	clear_logs	Completed
agialluc	Scheduler	2018-08-09 16:13:31 +02:00	Distro Tree	Provision	RHEL-ALT-7.6-20180809.n.0 Server s390x
agialluc	Scheduler	2018-08-09 16:07:43 +02:00	User	Reserved	agialluc
	Scheduler	2018-08-09 14:56:12 +02:00	Power	off	Completed
	Scheduler	2018-08-09 14:56:11 +02:00	Power	clear_netboot	Completed
agialluc	Scheduler	2018-08-09 14:56:06 +02:00	User	Returned	agialluc
HTTP/lab-02.rhts.en...	XMLRPC	2018-08-09 14:55:54 +02:00	Key/Value	Added	MODULE/ap
HTTP/lab-02.rhts.en...	XMLRPC	2018-08-09 14:55:54 +02:00	Key/Value	Added	MODULE/pkey



# INVENTORY MANAGEMENT

3.3

## MACHINE HISTORY

	Scheduler	2018-08-09 16:13:46 +02:00	Power	off	Completed
	Scheduler	2018-08-09 16:13:35 +02:00	Power	configure_netboot	Completed
	Scheduler	2018-08-09 16:13:33 +02:00	Power	clear_logs	Completed
agialluc	Scheduler	2018-08-09 16:13:31 +02:00	Distro Tree	Provision	RHEL-ALT-7.6-20180809.n.0 Server s390x
agialluc	Scheduler	2018-08-09 16:07:43 +02:00	User	Reserved	agialluc
	Scheduler	2018-08-09 14:56:12 +02:00	Power	off	Completed
	Scheduler	2018-08-09 14:56:11 +02:00	Power	clear_netboot	Completed
agialluc	Scheduler	2018-08-09 14:56:06 +02:00	User	Returned	agialluc
HTTP/lab-02.rhts.en...	XMLRPC	2018-08-09 14:55:54 +02:00	Key/Value	Added	MODULE/ap
HTTP/lab-02.rhts.en...	XMLRPC	2018-08-09 14:55:54 +02:00	Key/Value	Added	MODULE/pkey

T:100626620	/CoreOS/krb5/Sanity/dns-lookups-sanity	RHEL-7.8-20191009.6 Server s390x	2019-10-10 19:15:32 +02:00	2019-10-10 20:30:56 +02:00	Aborted	Fail
T:100626619	/CoreOS/freeradius/Sanity/sqlite-auth-test	RHEL-7.8-20191009.6 Server s390x	2019-10-10 19:14:42 +02:00	2019-10-10 19:15:32 +02:00	Completed	Pass
T:100626618	/CoreOS/openssh/Sanity/autocreate-server-keys-sanity-test	RHEL-7.8-20191009.6 Server s390x	2019-10-10 19:13:29 +02:00	2019-10-10 19:14:42 +02:00	Completed	Pass
T:100626617	/CoreOS/openldap/Regression/bz1024748-Init-script-configtest-function-fails-while-using	RHEL-7.8-20191009.6 Server s390x	2019-10-10 19:12:47 +02:00	2019-10-10 19:13:29 +02:00	Completed	Pass
T:100626616	/CoreOS/krb5/Sanity/getaddrinfo-return-values	RHEL-7.8-20191009.6 Server s390x	2019-10-10 19:11:42 +02:00	2019-10-10 19:12:47 +02:00	Completed	Fail
T:100626615	/CoreOS/openldap/Sanity/inplace_upgrade	RHEL-7.8-20191009.6 Server s390x	2019-10-10 19:10:25 +02:00	2019-10-10 19:11:42 +02:00	Completed	Pass
T:100626614	/CoreOS/authconfig/Regression/bz975203-Authconfig-does-not-restart-SSSD-or-Winbind-when	RHEL-7.8-20191009.6 Server s390x	2019-10-10 18:51:44 +02:00	2019-10-10 19:10:25 +02:00	Completed	Warn



# INVENTORY MANAGEMENT

3.4





# INVENTORY MANAGEMENT

An aerial photograph of a large shipping yard or port. The yard is filled with numerous rows of intermodal containers in various colors, including blue, red, white, and green. A yellow crane is visible in the lower-left area, and a white truck is parked in the center-right. The ground is paved and marked with white lines.

3.4

## ACCESS CONTROL

# INVENTORY MANAGEMENT

3.4

## ACCESS CONTROL

☐ Use policy from pool:

☒ Use custom access policy

	View	View power settings	Edit this policy	Edit system details	Loan to anyone	Loan to self	Control power	Reserve
<b>Group</b>								
kernel-adm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
qe-tools	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
rtt	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
multiarch-k8s	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="text" value="Group name"/> <input type="button" value="+ Add"/>								
<b>User</b>								
fweimer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="text" value="Username"/> <input type="button" value="+ Add"/>								
Everybody	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Save changes

Revert



# INVENTORY MANAGEMENT

3.5





# INVENTORY MANAGEMENT

An aerial photograph of a large shipping yard or port. The yard is filled with hundreds of intermodal containers stacked in neat, long rows. The containers are in various colors, including blue, red, white, and green. Several yellow and orange forklifts are visible, moving through the aisles between the stacks of containers. The ground is paved and marked with white lines. The overall scene depicts a busy logistics and inventory management environment.

3.5

## HARDWARE POOL FILTERING



# INVENTORY MANAGEMENT

3.5

## HARDWARE POOL FILTERING

Items found: 9106

1

2

3

4

5

...456



# INVENTORY MANAGEMENT

3.5

## HARDWARE POOL FILTERING

Items found: 9106

1

2

3

4

5

...456

[Hide Search Options](#)

Table

Operation

Value

CPU/Processors

greater than

4

[✕ Remove](#)

# INVENTORY MANAGEMENT

3.5

## HARDWARE POOL FILTERING

Items found: 9106

1

2

3

4

5

...456

[Hide Search Options](#)

Table	Operation	Value	
CPU/Processors	greater than	4	<a href="#">✕ Remove</a>
System/Arch	contains	x86	<a href="#">✕ Remove</a>



# INVENTORY MANAGEMENT

3.5

## HARDWARE POOL FILTERING

Items found: 9106

1

2

3

4

5

...456

[Hide Search Options](#)

Table	Operation	Value	
CPU/Processors	greater than	4	<a href="#">✕ Remove</a>
System/Arch	contains	x86	<a href="#">✕ Remove</a>
System/Location	contains	BRQ	<a href="#">✕ Remove</a>

# INVENTORY MANAGEMENT

3.5

## HARDWARE POOL FILTERING

Items found: 9106

1

2

3

4

5

...456

[Hide Search Options](#)

Table	Operation	Value	
CPU/Processors	greater than	4	<a href="#">✕ Remove</a>
System/Arch	contains	x86	<a href="#">✕ Remove</a>
System/Location	contains	BRQ	<a href="#">✕ Remove</a>
System/Added	before	2018-10-31	<a href="#">✕ Remove</a>

[+ Add](#)

[Toggle Result Columns](#)



# INVENTORY MANAGEMENT

3.5

## HARDWARE POOL FILTERING

Items found: 9106

1

2

3

4

5

...456

Items found: 183

1

2

3

4

5

...10

Name	Arch	Vendor	Model	Location	Status	Type
<a href="#">amq03.lab.eng.brq.redhat.com</a>	i386, x86_64	HP	ProLiant DL360 Gen9 (755258-B21)	BRQ; Englab; Rack #5; Unit 24	Manual	Machine
<a href="#">amq04.lab.eng.brq.redhat.com</a>	i386, x86_64	HP	ProLiant DL360 Gen9 (755258-B21)	BRQ; Englab; Rack #5; Unit 25	Manual	Machine
<a href="#">aveselov.lab.eng.brq.redhat.com</a>	i386, x86_64	TAROX	Small Desktop (SFF) (SKU)	BRQ; Minilab; Rack L4	Manual	Machine
<a href="#">barb-01.lab.eng.brq.redhat.com</a>	i386, x86_64	IBM	x3550m4	BRQ; Englab; Rack #9; Slot #33	Broken	Machine
<a href="#">barb-02.lab.eng.brq.redhat.com</a>	i386, x86_64	IBM	x3250m4	BRQ; Englab; Rack #9; Slot #32	Broken	Machine
<a href="#">barb-03.lab.eng.brq.redhat.com</a>	i386, x86_64	IBM	x3250m4	BRQ; Englab; Rack #9; Slot #31	Broken	Machine
<a href="#">bigdata-qe-01.lab.eng.brq.redhat.com</a>	i386, x86_64	HP	ProLiant DL360p g8	BRQ; Englab; Rack #10; Unit 24	Manual	Machine

# SCHEDULING



# SCHEDULING



2106	D01	11:15am	Boarding
4547	B12	1:30pm	On Time
780	C03	11:05am	Boarding
4649	E83	3:00pm	On Time
5296	E83	2:00pm	On Time
6729	D09	11:00am	Boarding
7383	E70	11:10am	On Time
	B7	11:09am	On Time
			Boarding

# SCHEDULING

4.2

## JOBS & RECIPES



2106	D01	11:15am	Boarding
2780	C03	11:05am	Boarding
4649	E83	3:00pm	On Time
5296	E83	2:00pm	On Time
6729	D09	11:00am	Boarding
7383	E70	11:10am	On Time
87	B7	11:09am	On Time



# SCHEDULING

4.2

## JOBS & RECIPES

JOB			
RECIPE SET		RECIPE SET	
RECIPE	RECIPE	RECIPE	RECIPE
TASKS	TASKS	TASKS	TASKS

# SCHEDULING

4.3



## JOB CONTENT

## JOB CONTENT

- XML

```
<job>  
  <whi  
  <...>
```



## JOB CONTENT

- XML
- GENERAL INFO

```
<whiteboard>Example Job</whiteboard>
```

```
<partitions>  
  <partition  
</partitions>
```

## JOB CONTENT

- XML
- GENERAL INFO
- LINUX DISTRIBUTION

```
<distroRequires>
```



## JOB CONTENT

- XML
- GENERAL INFO
- LINUX DISTRIBUTION
- HOST FILTER

```
<hostRequires>  
  <and>
```

## JOB CONTENT

- XML
- GENERAL INFO
- LINUX DISTRIBUTION
- HOST FILTER
- TASKS

```
<task name="/distribution/check-install" role="STANDALONE"/>

<task name="Boot test" role="STANDALONE">
  <fetch url="https://remotegit.repo"/>
</task>

<task name="Kernel Header Sanity Test" role="STANDALONE">
  <fetch url="https://remotegit.repo"/>
  <params>
    <param name="KILLTIMEOVERRIDE" value="600"/>
  </params>
</task>
```



# PROVISIONING

# PROVISIONING

5.2





# PROVISIONING

5.2

PROCESS



# PROVISIONING

5.2

## PROCESS

Beaker Server



Lab Controller



Machine A



Machine Pool



# PROVISIONING

5.2

## PROCESS

Beaker Server



Lab Controller



Machine A



## 1. GENERATE PXE CONFIG



Machine Pool

# PROVISIONING

5.2

## PROCESS

Beaker Server



Lab Controller



Machine A



## 2. POWER ON



Machine Pool



# PROVISIONING

5.2

## PROCESS

Beaker Server



Lab Controller



Machine A



## 3. FETCH PXE CONFIG



Machine Pool



# PROVISIONING

5.2

## PROCESS

Beaker Server



Lab Controller



Machine A



## 4. INITIAL BOOT



Machine Pool

# PROVISIONING

5.2

## PROCESS

Beaker Server



Lab Controller



Machine A



## 5. INSTALLATION COMPLETE



Machine Pool



# PROVISIONING

5.2

## PROCESS

Beaker Server



Lab Controller



Machine A



## 6. REBOOT



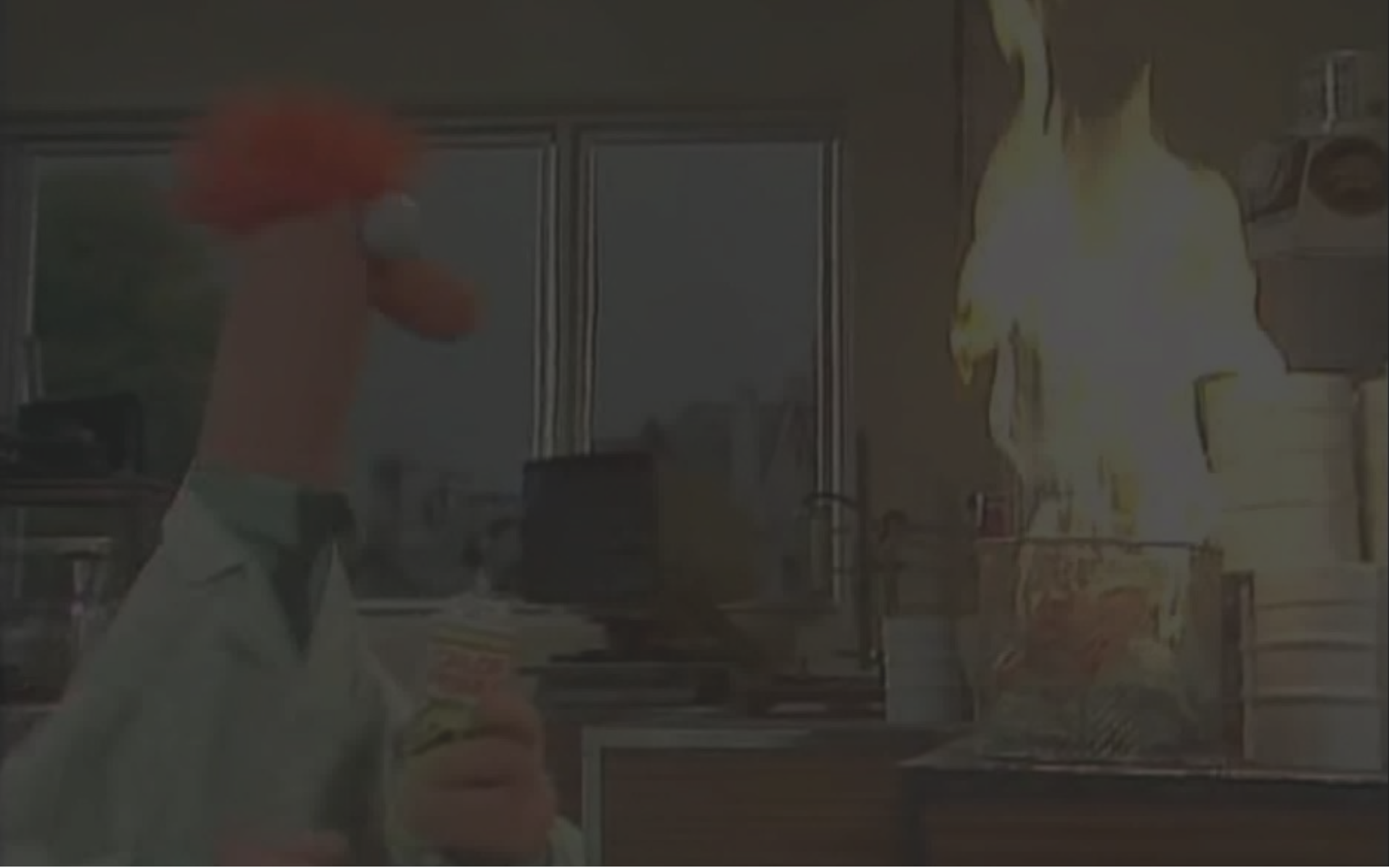
Machine Pool



# TESTING

# TESTING

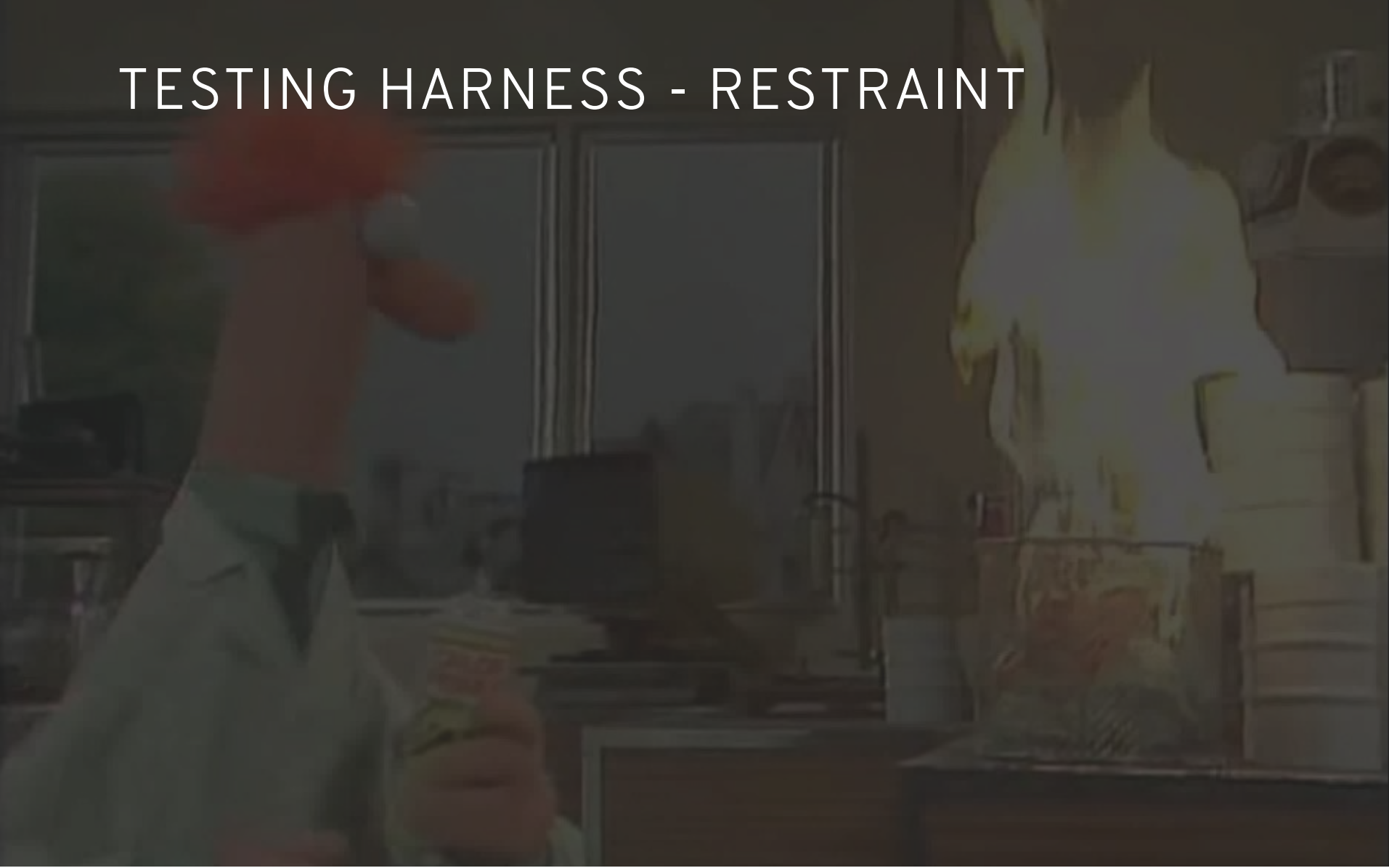
6.2



# TESTING

6.2

## TESTING HARNESS - RESTRAINT

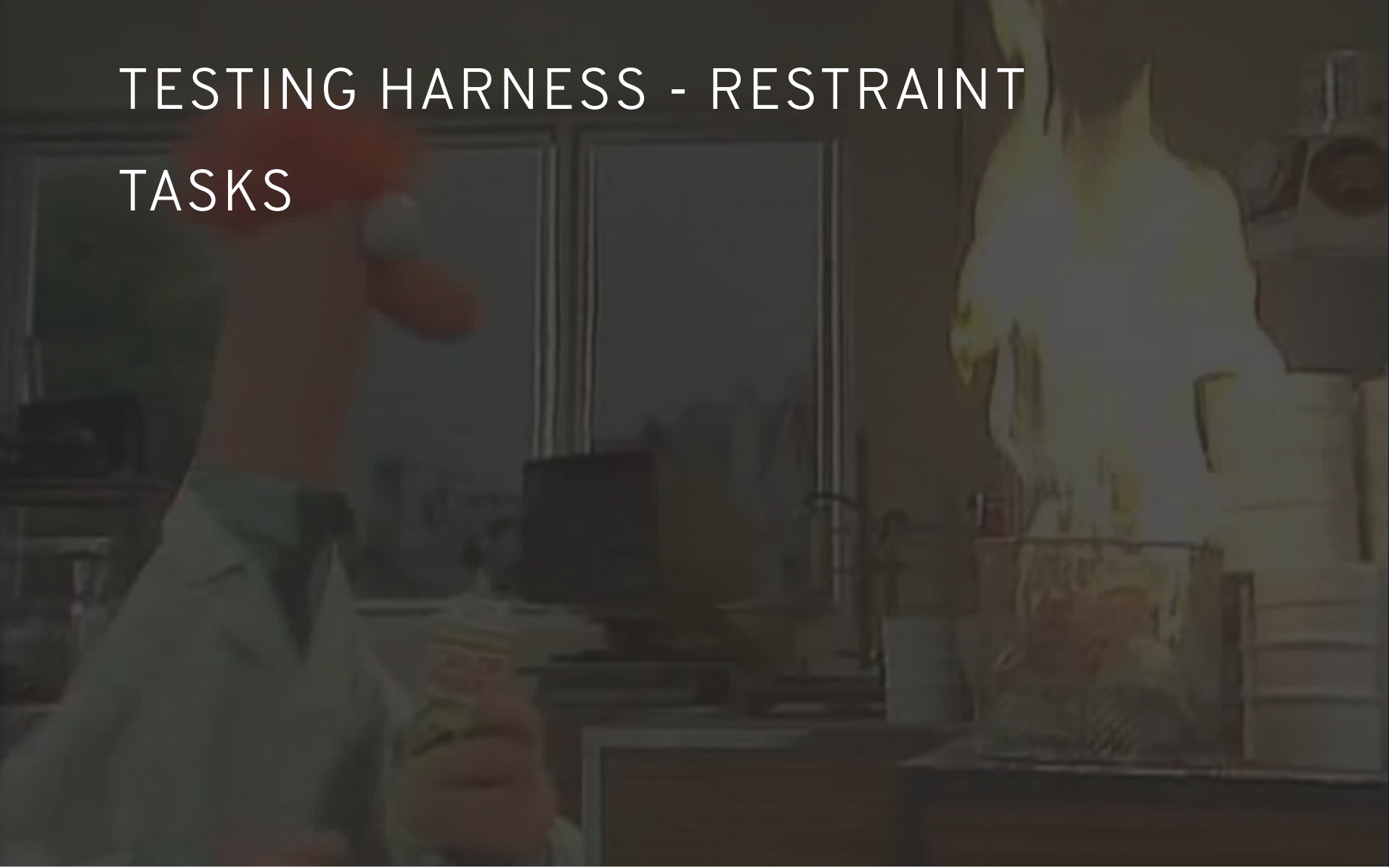




# TESTING

6.2

## TESTING HARNESS - RESTRAINT TASKS



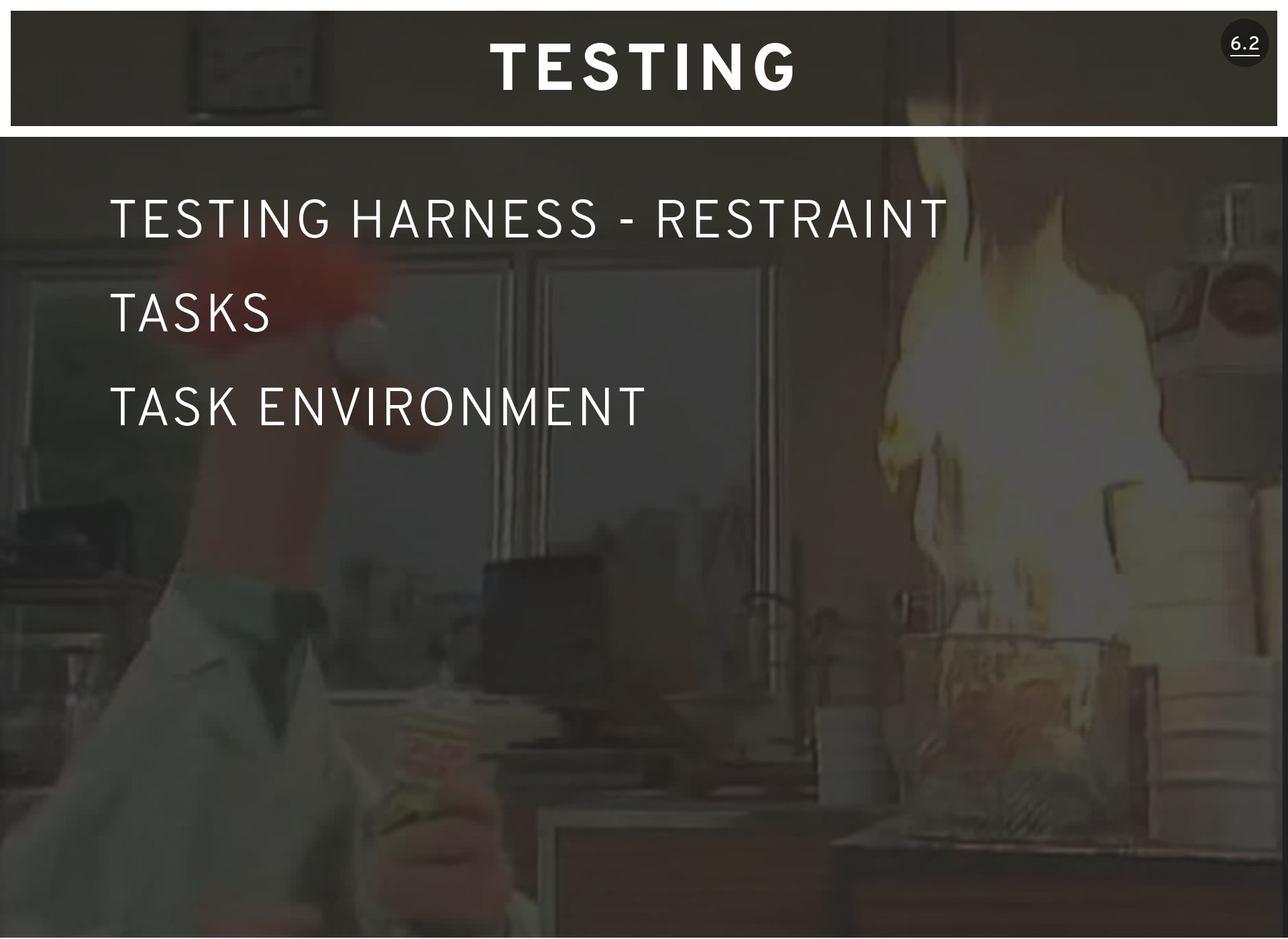
# TESTING

6.2

TESTING HARNESS - RESTRAINT

TASKS

TASK ENVIRONMENT



# TESTING

6.2

TESTING HARNESS - RESTRAINT

TASKS

TASK ENVIRONMENT

RESULT REPORTING



# TESTING

6.2

TESTING HARNESS - RESTRAINT  
TASKS

TASK ENVIRONMENT

RESULT REPORTING

MULTI-HOST SUPPORT

# TESTING

6.2

TESTING HARNESS - RESTRAINT

TASKS

TASK ENVIRONMENT

RESULT REPORTING

MULTI-HOST SUPPORT

VIRTUAL GUESTS

# TESTING

6.2

TESTING HARNESS - RESTRAINT

TASKS

TASK ENVIRONMENT

RESULT REPORTING

MULTI-HOST SUPPORT

VIRTUAL GUESTS

WATCHDOGS



# RESULT & LOG COLLECTION



# RESULT & LOG COLLECTION

7.2



# RESULT & LOG COLLECTION

7.2

**R:7515693** 1 of 3 recipes in [J:3865616](#)

Edit

Clone

View as: [Beaker results XML](#) · [JUnit XML](#)

Started 4 hours ago.

Using [RHEL-7.8-20191009.6 Server ppc64le](#)  
on 

WHITEBOARD

(empty)

Console output

Remaining watchdog time: 01:05:24

Installation

Tasks

Reservation

**Fail** with 36 out of 40 tasks finished.

90% 

▼ T:101387422 +00:10:30 [/distribution/check-install](#) 1.0-2

 taskout.log + 1  **Pass**

Results Settings

TR:466912416 +00:10:39 [/distribution/check-install](#)

 dmesg.log  620 **Pass**

TR:466912449 +00:10:46 [/distribution/check-install/Sysinfo](#)

 resultoutputfile.log  **Pass**

📁 T:101387423 +00:10:48 [/test/misc/machineinfo](#)

 taskout.log + 3  **Pass**

▶ T:101387424 +00:12:04 Boot test

 taskout.log + 1  **Pass**

▼ T:101387425 +00:14:40 [/kernel/distribution/ftp/lite](#) 20190930-1



 taskout.log + 4  **Pass**

Results Settings

TR:466914729 +00:17:42 install

 resultoutputfile.log  **Pass**

TR:466924962 +00:56:23 RHELKT1LITE.FILTERED

 resultoutputfile.log + 1  **Pass**



# RESULT & LOG COLLECTION

7.2

1

 Console output

Remaining watchdog time: 01:05:24

2

90%



3

 dmesg.log



620

Pass

4

 +00:10:30 /distribution/check-install 1.0-2



# HOW CAN YOU CONTRIBUTE



# HOW CAN YOU CONTRIBUTE

8.2

## PROJECT LOCATIONS

**BEAKER  
& RESTRAINT**

[BEAKER-PROJECT.ORG](https://beaker-project.org)  
[GITHUB.COM/BEAKER-PROJECT](https://github.com/beaker-project)

## CONTACT

**PUBLIC  
PRIVATE**

[BEAKER-DEVEL@LISTS.FEDORAHOSTED.ORG](mailto:BEAKER-DEVEL@LISTS.FEDORAHOSTED.ORG)  
[DEVELOPERS@BEAKER-PROJECT.ORG](mailto:DEVELOPERS@BEAKER-PROJECT.ORG)

**DISCUSSIONS?**

[TKLOHNA@REDHAT.COM](mailto:TKLOHNA@REDHAT.COM)





**QUESTIONS?**



**Red Hat**



**Beaker**

**THANK YOU!**